Comparison of Ramsauer and Optical Model Neutron Angular Distributions

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In a recent paper [1] it has been shown that the nuclear Ramsauer model does not do well in representing details of the angular distribution of neutron elastic scattering for incident energies of less than 60 MeV for ^{208}Pb. We show that the default angular bin dispersion most widely used in Monte Carlo transport codes is such that the observed difference in angular shapes are on too fine a scale to affect transport calculations. The effect of increasing the number of Monte Carlo angle bins is studied to determine the dispersion necessary for calculations to be sensitive to the observed discrepancies in angular distributions. We also show that transport calculations are sensitive to differences in the elastic scattering cross section given by recent optical model fits of ^{208}Pb data compared with older fits.

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[1] MOFAZZAL AZAM and RAJESH G. GOWDA, "Scattering of Intermediate Neutrons from Nuclei and the Ramsauer Hypothesis", Nucl. Sci. Eng. 144, 86 (2003).

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